

PATENT CLAIMS:

1. A method of manufacture of reinforced composite products in a closed mould process, whereby a product moulding volume is defined between a first and a second
5 mould part and the moulding volume is in fluid contact to at least one moulding material reservoir and a vacuum source, whereby

the moulding material is drawn into the moulding volume when vacuum is applied to the moulding volume, wherein the first mould part comprises an inner liner of a pre-
10 shaped, flexible modified fluorinated plastic foil and wherein the mould parts are clamped together before vacuum is applied, and

the mould parts are detached from each other when a predetermined amount of resin is filled into the moulding volume, so that the moulded composite product may be
15 removed and the mould is ready for repeating the moulding process.

2. A method according to claim 1, whereby the first mould part is a female mould part and the second mould part is a male mould part.

20 3. A method according to claim 1 or 2, whereby reinforcement fibre material are provided in the moulding volume prior to the assembly of the first and second mould parts.

4. A method according to any of the claims 1 to 3, whereby the reinforcement
25 material is a glass, stone, ceramic, carbon, organic and synthetic fibre fabric.

5. A method according to any of the preceding claims, whereby the inner surface of the foil is smooth.

30 6. A method according to any of the claims 1 to 4, whereby the inner surface of the foil is structured.

7. A method according to claim 6, whereby the mould part are assembled and since the structured surface of the foil allows a flow of air to be transported towards the vacuum outlet of the moulding volume, vacuum is applied and gelcoat is drawn or
5 injected into the mould, after curing the mould is opened before the reinforcement fibres are provided and the mould is reassembled and closed moulding process is executed.
8. A method according to any of the preceding claims, whereby the inner liner is
10 translucent.
9. A method according to any of the preceding claims, whereby the first and second mould parts are assembled over an annular airtight sealing member encompassing the moulding volume carrying the inner liner, thus said airtight sealing member
15 belonging to the second mould part, which may be clamped onto the first mould part.
10. A method according to claim 9, whereby the sealing comprises two annular sealing members defining an annular sealing volume around the moulding volume, and vacuum is applied to this annular sealing volume.
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11. A method according to claim 10, whereby the vacuum in the sealing volume is larger than the vacuum in the moulding volume during the vacuum forming process.
12. A method according to any of the preceding claims, whereby the foil is a
25 fluoroplastic laminated foil, preferably with a thickness of 0.05 to 1.5 mm, which can be assembled in small or big panels suited to the products to be moulded.
13. A method according to any of the preceding claims, whereby prior to the moulding process is initiated, a reinforcement fibre mat is placed over the inner liner
30 which in turn is placed over the airbag, which is then inflated so it fills out the space

inside the other mould part and puts the inner liner and the fibre reinforcement in place relative to the other mould form part.

14. A method according to any of the preceding claims, whereby the moulding
5 material is supplied into the moulding volume under pressure using vacuum assisted pressure injection.

15. A moulding device for the manufacture of composites in a closed mould process, whereby a product moulding volume is defined between a first and a second mould
10 part and the moulding volume is in fluid contact to at least one moulding material reservoir and a vacuum source, whereby the moulding material is drawn into the moulding volume when vacuum is applied to the moulding volume, wherein the first mould part comprises an inner liner of a pre-shaped, flexible modified fluorinated plastic foil and wherein the mould parts are clamped together before vacuum is
15 applied and detached again when the moulding volume is filled and the moulding process is over, so that the moulded member may be removed and the mould is ready for repeating the moulding process.

16. A moulding device according to claim 15, wherein the first mould part is a
20 female mould part and the second mould part is a male mould part.

17. A moulding device according to claim 15 or 16, wherein reinforcement fibre material are provided in the moulding volume prior to the assembly of the first and second mould parts.

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18. A moulding device according to any of the claims 15 to 17, wherein the reinforcement material is a glass stone, ceramic, carbon, organic and synthetic fibre fabric.

30 19. A moulding device according to any of the claims 15 to 18, wherein the inner surface of the foil is smooth.

20. A moulding device according to any of the claims 15 to 18, wherein the inner surface of the foil is structured.
- 5 21. A moulding device according to any of the claims 15 to 20, wherein the inner liner is translucent.
22. A moulding device according to any of the claims 15 to 21, wherein the foil is a laminate consisting of at least two, preferably three layers of fluoroplastic material,
10 selected from a group consisting of PFA (perfluoro alkoxy), FEP (Fluorinated ethylene propylene, TFE (tetra flour ethylene), ETFE (ethylene tetra flour ethylene), ECTFE (ethylene chloride triflour ethylene) TFM (modified polytetrafluoroethylene) and virgin PTFE (polytetrafluoroethylene).
- 15 23. A moulding device according to any of the claims 15 to 21, wherein the foil is a extruded plastified fluoroplast, selected from a group consisting of PFA (perfluoro alkoxy), FEP (Fluorinated ethylene propylene, TFE (tetra flour ethylene), ETFE (ethylene tetra flour ethylene), ECTFE (ethylene chloride triflour ethylene) TFM (modified polytetrafluoroethylene) or similar materials.
- 20 24. A moulding device according to any of the claim 15 to 23, wherein the first and second mould parts are assembled over an annular airtight sealing member encompassing the moulding volume carrying the inner liner, thus said airtight sealing member belonging to the second mould part, which may be clamped onto the first
25 mould part.
25. A moulding device according to claim 24, wherein the sealing between the first and second mould part comprises two annular sealing members defining an annular sealing volume around the moulding volume, and vacuum is applied to this annular
30 sealing volume.

26. A moulding device according to claim 25, wherein the vacuum V_1 in the sealing volume is larger than the vacuum V_1 in the moulding volume during the vacuum forming process.
- 5 27. A moulding device according to any of the claims 15 to 26, wherein the inner liner is pre-shaped so that it corresponds to the shape of the product to be moulded.
28. A moulding device according to any of the claims 15 to 27, whereby the foil is a fluoroplastic laminated foil, preferably with a thickness of 0.05 to 1.5 mm, which can
10 be assembled in small or big panels suited to the products to be moulded.
29. An inner liner for a vacuum infusion moulding process for the manufacture of fibre reinforced composite products, whereby a product moulding volume is defined between the inner liner, constituting a first mould part and a second mould part and
15 the moulding volume is in fluid contact to at least one moulding material reservoir and a vacuum source, and where the moulding material is drawn into the moulding volume when vacuum is applied to the moulding volume, wherein the inner liner is a pre-shaped, flexible modified fluorinated plastic foil.
- 20 30. An inner liner according to claim 29, wherein the laminate consists of at least two, preferably three layers of fluoroplastic material, selected from a group consisting of PFA (perfluoro alkoxy), FEP (Fluorinated ethylene propylene, TFE (tetra flour ethylene), ETFE (ethylene tetra flour ethylene), ECTFE (ethylene chloride triflour ethylene) TFM (modified polytetrafluoroethylene) and virgin PTFE
25 (polytetrafluoroethylene).